



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6  
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DALLAS TX 75202-2733

DEC 08 2011

Mr. David Keith  
Project Coordinator  
Anchor QEA, LLC  
614 Magnolia Avenue  
Ocean Springs, MS 39654

RE: Draft Preliminary Site Characterization Report  
San Jacinto River Waste Pits Superfund Site, Harris County, Texas  
Unilateral Administrative Order, CERCLA Docket No. 06-03-10

Dear Mr. Keith:

The Environmental Protection Agency (EPA) has performed a review of the above referenced document dated July 2011. With this letter, the EPA approves the Preliminary Site Characterization Report (PSCR). The enclosed comments shall be incorporated in the Remedial Investigation Report. Further, as discussed previously, a table summarizing the comments and proposed changes will also be submitted for approval. Finally, a revised PSCR will also be submitted.

If you have any questions, please contact me at (214) 665-8318, or send an e-mail message to [miller.garyg@epa.gov](mailto:miller.garyg@epa.gov).

Sincerely yours,

A handwritten signature in black ink, appearing to read "Gary Miller", is written over a circular stamp.

Gary Miller, P.E.  
Remediation Project Manager

Enclosure

cc: Luda Voskov (TCEQ)  
Bob Allen (Harris County)  
Nicole Hausler (Port of Houston)  
Jessica White (NOAA)

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Sincerely yours,

*mgm* 12/8/11

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SANCHEZ

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*Am Villarreal*  
*Ben*  
*Carlos Sanchez*  
12/8/2011

HERNANDEZ

6RC-S

*JH* 12/7/11

**Comments Relating to the PSCR to be Included in the Remedial Investigation Report:**

1. Page 1-4, Section 1.3.2: When comparing Table 1-1 COIs to Table 1-2 COPCs, VOCs are eliminated from the list. Appendix C of the work plan explains the selection of COPC's. According to Appendix C, no VOCs were collected during 2006, but VOCs were eliminated. The rationale for eliminations of VOCs from the COPCs shall be included in the report.
2. Page 5-3, Section 5.2.2: The report shall clarify why the existing surface water datasets are adequate.
3. Page 5-5, Section 5.3: "One such dataset has undergone the required QA review (See Appendix A to COPC Technical Memorandum), and its classification was changed from Category 2 to Category 1. It is unclear which of the data sets listed was changed; the report shall be revised to clarify which dataset was changed to Category 1.
4. Page 5-8, Section 5.4: This section indicates that none of the analyses or summaries in this document use TEQs calculated with bird or fish TEFs, but that Table 5-10 presents the bird and fish TEFs to be used in future analyses. The report shall be revised to clarify this. For human health risk assessment the WHO 2005 TEFs shall be utilized, not bird and fish TEFs.
5. Page 5-8, Section 5.4: It is important to make sure that the TEQ screening level selected will be protective of both fish and aquatic dependent wildlife receptors. Appropriate TEFs shall be utilized when the risks are analyzed.
6. Page 6-9, Section 6.1.1.3.2: Analyses performed on the waste samples using ASTM D 5084 is for hydraulic conductivity not permeability. References to permeability shall be corrected here and all other appropriate places in the report. Also, the text "Falling Head, Rising Tail Hydraulic Conductivity..." shall be corrected to "...Rising Tailwater..."
7. Page 6-12, Section 6.1.1.5 (and other sections): GWBU-A and GWBU-B were determined to be Class 3 groundwaters based on estimated TDS values calculated from conductivity measurements. The TDS values were estimated using a conversion factor of 0.75. The relationship between conductivity and salinity is dependent on the chemical makeup of the water and may vary. One reference (Water Monitoring and Assessment, EPA; <http://water.epa.gov/type/rsl/monitoring/vms59.cfm>) states that the factor may vary between 0.55 and 0.90. Further, according to the TCEQ Regulatory Guidance, TRRP-8, Section 2.6.1, "estimation of groundwater TDS based on measurement of specific conductance is not acceptable for the purpose of groundwater resource classification." The statements regarding the classifications of the groundwater bearing units shall be deleted.

8. Page 6-12 through 6-15, Section 6.1.1.6: The report does not include interpretations of the stream flow. The report shall include a discussion of whether tidal flow has any stratification, whether there is a net flow landward at the bottom of the channel, and the tidal excursion length transportation of contaminants upstream.
9. Page 6-13, Section 6.1.1.6.2: There is another USGS gage located on Peach Creek which shall be added to the other 6 tributaries. Peach Creek is a small watershed, but data is available and shall be used for any mass balance calculations.
10. Page 6-13, Section 6.1.1.6.2 In-stream flows: This section describes how flow rates were determined and used for flood frequency analysis. However, this section shall state that the actual flow at the site has a lot of uncertainty due to tidal influence and potential overland flow from rain events downstream of Lake Houston Dam.
11. Page 6-14, Section 6.1.1.6.2: The 16 yr-period shall be changed to 15 years; and the 24-yr period shall be changed to 25 years. The flood frequency analysis shall be provided in the report.
12. Page 6-14 and 6-15, Section 6.1.1.6.5: The report shall provide reference to a map showing the location of the velocity collection (Figure 6-10) point. The report shall also clarify how stage was obtained. The text describes data in cubic feet per second units, but Figure 6-10 shows velocity in centimeter per second units. Consistent units shall be used in figures and the relevant discussion in the text.
13. Page 6-27, Section 6.1.3: In the discussion of clams, the text regarding Cedar Bayou (as background), shall be replaced with the upstream background. No clams were collected in Cedar Bayou.
14. Page 6-28, Section 6.2: The list of over-arching objectives shall also include evaluation of groundwater quality and fish tissue concentrations relative to state and federal water quality standards.
15. Page 6-29, Section 6.2.1.1: The discussion indicates that the upper tolerance limit (UTL) on background data is called the reference envelope value, or REV, and its derivation and use is discussed in the Data Interpretation Methods for the San Jacinto River Waste Pits RI/FS Memorandum (Integral 2010b). The referenced memo clearly lays out the UTL as the statistical representation for the REV. This seems to conflict with page 25 of the Final Tissue SAP, which states that an upper prediction limit (UPL) for the background data will be calculated to represent the reference envelope of background concentrations for each chemical in tissue. This conflict shall be resolved. Further, an appropriate test for data outliers shall be included with the background calculations.
16. Page 6-30, Section 6.2.1.1.1: The report shall clarify why there is no sub-surface samples collected for the reference (upstream) data set.

17. Page 6-32, Section 6.2.1.2.1: The report shall include the rationale for the statistical methods used. A Kruskal-Wallis nonparametric AOV by ranks followed by an a posteriori test (Tukey Test) should be considered given the sample sizes available in the three Site locations and two background areas.
18. Page 6-37, Section 6.2.1.3.2: Cedar Bayou tissue REVs were compared with historical tissue data (1969 through 2008) collected within the San Jacinto River Estuary, with the conclusion that crab and fish tissue TEQ<sub>DF</sub> values are decidedly greater within the historical data set. This discussion closes with a statement that "these results highlight a potential data gap in our understanding of offsite conditions with respect to evaluation of incremental risks resulting from contamination of tissues collected from on the Site and that additional information on the concentrations of dioxins and furans in edible crab and catfish tissues from background areas may be needed to effectively characterize off-Site risks..." The analysis shall also consider the possibility that this is an "apples and oranges" comparison from a temporal aspect since historical concentrations of dioxins and furans in the system are generally higher than present day concentrations.
19. Page 6-38, Section 6.2.2: In Table 6-55, the Tau and p values for lipid-normalized tissue vs. OC-normalized sediment are the same for edible and whole body crab tissue. The report shall discuss the why this is the case and whether it is expected or not.
20. Page 6-39, Section 6.2.2.1: This section indicates that a regression analysis was the method used to investigate sediment-tissue relationships. However, the calculation of site-specific BSAFs is important in order to be able to determine the acceptable sediment concentration to be protective of the human consumption of edible fish and shellfish. The report shall be revised to also include BSAFs in determining acceptable sediment concentrations for a comparison to the proposed method. For example, the TCEQ Regulatory Guidance RG-366/TRRP-24 suggests the determination of the acceptable sediment concentration (SedSedFish PCL) by dividing the acceptable fish tissue concentration (RBELFish) by the appropriate site-specific or literature-derived BSAF [SedSedFish PCL (mg/kg) = (RBELFish/BSAF)].
21. Page 6-39, Section 6.2.2.1: The report shall provide the correlation results (i.e., R or R<sup>2</sup> as appropriate) between tissue and sediment TEQ for each of the various tissues.
22. Page 6-39, Section 6.2.2.1: The report shall subdivide the crab and catfish tissue data within the individual fish collection areas (FCAs) to possibly improve the correlation analysis. This may particularly improve the analysis if the subareas are subdivided into the areas closer and more distal to the waste pits.

23. Page 6-39, Section 6.2.2.1: The following presentations of data shall be included in the report to provide more transparency to this analysis:
- Include a summary of dioxin and furan concentrations in surface sediment for each of the FCAs (similar to Table 6-17 for soil).
  - Summarize the paired sediment information that was used to compare with the clam and killifish tissue data (as presented in Tables 6-56 and 6-57).
  - Provide the data from the sediment averaging method to support the choice of the nearest four sediment samples for clams and killifish.
24. Page 6-41, Section 6.2.2.3: Dioxin/furan patterns in clam tissue and associated sediments were plotted pair-wise in the series of figures presented in Appendix E. The fingerprint comparisons in Appendix E seem to indicate more of a correlation with distance from the pits than with the fingerprints of sediments associated with each transect. For instance, Transect 7 clam tissues appear to be enriched in site contaminants compared with those for Transect 8, even though both are in the area designated as "background." The report shall provide tables and maps that display the paired summary statistics for tissue and sediment data for each transect. The maps shall show the clam tissue concentration data and sample locations, and the sediment concentration data and sample locations. These would show the sediment data that was paired with the tissue data in the fingerprint displays in Appendix E. The table shall show all clam data (all congeners and TEQs) summarized by transect. The summary shall include the number of samples and minimum, maximum, median, and mean for each transect.
25. Page 6-47, Section 6.2.3.1: The description of the non-negative matrix factorization (NMF) method for un-mixing analysis shall note that the assumptions of the method are that individual congeners and contaminants are conserved (not degraded), and not differentially adsorbed or desorbed from sediment or soils. The report shall demonstrate the validity of these and any other inherent assumptions for this application.
26. Page 6-50, Section 6.2.3.2.2: The report shall specifically relate the discussion in the last paragraph of this section to Table 6-59 for clarity.
27. Page 6-50, Section 6.2.3.2.2: The unmixing analysis described here does identify the same two end members found in the TCEQ/U.S. EPA graphical evaluation (Turner and Broach, 2011) of the sediment data. The report's unmixing analysis does not address the drastically different TEQ values found in samples at either end of this spectrum. Samples that are almost entirely reflective of the EM1 signature generally have very low TEQ concentrations whereas samples that are closest to EM2 in their fingerprints have very high TEQ concentrations. The analysis shall be modified to include a characterization of this aspect of samples from the two ends of the spectrum. A table shall be included to summarize the range of the dioxin TEQ values for the 176 samples that had no detectable fraction of EM2, and another table summarizing the TEQ values for the samples with the highest percentage attributed to EM2. Looking at Table 6-59, it appears that about 10 sediment

samples were estimated to contain more than 95% EM2. The table shall include one row that summarizes TEQs where the EM2 best estimate is zero. The columns would include number of values, TEQ maximum, minimum, and mean. A second row would be a TEQ summary for the sample locations where the EM2 best estimate value is 95% or more with the same column designations. The first row should include samples that are mostly EM1 (EM2 is zero), and the second row mostly EM2 (>95% EM2).

The difference in the relative concentrations of TEQ<sub>DF</sub> associated with the two end members is an important distinction to make, because a sample could have only 1% pit waste and still have a TEQ<sub>DF</sub> concentration of around 300 ppt, which could still be significant. The discussion about the distance waste may have traveled from the pit or which samples contain "significant" amounts of site contaminants, shall take into account the relative toxicity associated with the different end members.

28. Page 6-50, Section 6.2.3.2.3: The last sentence in the first paragraph shall be revised to state that the EM2 pattern source material is not confined within the perimeter of the 1966 impoundments, but that the largest part is within the impoundment.
29. Page 6-53, Section 6.2.3.3: Summary statements are made about the Site although it appears that only data from north of I-10 were used. The report shall clarify the basis for the summary statements in this section.
30. Page 6-53, Section 6.2.3.3: The last two bullets shall be revised to reflect the information regarding the relative contribution of EM1 versus EM2 end members to the overall TEQ<sub>DF</sub> for sediments in the waste pits and those outside the pits but within the U.S. EPA's preliminary site perimeter.
31. Page 6-54, Section 6.2.4.1: The discussion indicated that groundwater concentrations from all six monitoring wells and that at well SJMWS04 (identified as "perched") were below the TRRP GWClass3 PCL applicable to dioxins and furans as 2,3,7,8-TCDD TEQ (3,000 pg/L). The groundwater ingestion pathway may not be the only relevant pathway for comparison. Groundwater shall also meet other relevant ecological and human health PCLs as dictated by the final conceptual site model. These include groundwater-to-surface water/sediment PCLs protective of wildlife and benthos, and groundwater-to-surface water/sediment PCLs protective of human health (for fish and shellfish consumption).
32. Page 6-56, Section 6.2.4.4.3: The transport of dioxins and furans through groundwater is highly unlikely due to the nature of the contaminant and the geology of the site. The perched zone does have a potential for lateral movement towards surface water bodies and thus is a potential pathway to receptors and shall be considered in the conceptual site model. The report states that well SJMWS04 had the only detection of 2,3,7,8-TCDD in any well. However, other dioxins were detected, and the PSCR shall be revised to reflect this.

The “perched” subsurface zone of saturation in soils of the north impoundment waste pit is considered to be groundwater (Fetter, 1988; Todd, 1980; TCEQ, 2010; Sec 6.2.4.4.3, Subject Report) in which leachate forms and from which leachate migrates. Analytical results indicate groundwater in the waste impoundment soils is affected (Sec 6.2.4.4.3, Subject Report). As such, the groundwater-to-surface water exposure pathway and the groundwater-to-sediment exposure pathway are potentially open until they can be closed by evaluation. The report shall be revised to reflect this. Appendix G (Subject Report) shall also reflect those exposure pathways.

33. Page 6-65, Section 6.3.1.2: The sentences regarding the conclusion that dioxins and furans have not been significantly released from the southern impoundments shall be deleted. Previous sampling did not include the entire southern impoundment area or all media (groundwater was not sampled), and additional sampling is being planned to determine the extent of contamination there. The groundwater-to-surface water/sediment exposure pathways are considered to be open in lieu of information to the contrary and the south impoundment CSM shall reflect this.
34. Page 6-70, Section 6.3.2.3.2: This section fails to address the groundwater in the soils inside the north waste impoundment and the associated groundwater-to-surface water/sediment pathways. The report shall be revised to include these pathways.
35. Page 6-73, Section 6.4.3: This section fails to address the groundwater in the soils inside the south waste impoundment and the associated groundwater-to-surface water/sediment pathways. The report shall be revised to include these pathways.
36. Page 7-11, Section 7.2.2: The report mentions the groundwater study for the Site. It is not clear which study is being referenced, and the report shall include a reference for this groundwater study.
37. Page 7-13, Section 7.2.3.2.1: The characterization that sediment concentrations southwest of the peninsula do not show dioxin and furans contamination above background is not accurate. Surface sediment samples in this area contained 52.6 and 49.3 ng/kg TEQ<sub>DF</sub> concentrations. The report shall be revised to correct this.
38. Page 7-14, Section 7.2.3.2.2: This section states that there is enough evidence to exclude groundwater from the south impoundment. The discussion of groundwater in this section is similar to that for the north impoundment. That is, the contention that “groundwater” does not exist in the impoundment, only beneath isolating non-transmissive units. Such contentions are not valid and the report section shall be amended to reflect the objectives of the future south impoundment groundwater study and the sampling of groundwater within the soils of the waste impoundment. Groundwater shall not be eliminated as a potential pathway until proven otherwise at the south impoundment.



39. Page 7-16, Section 7.3.3: Statements regarding groundwater studies and COPC transport in groundwater for the south impoundment area (last two sentences in section) are not valid and shall be removed. No groundwater investigation of the soils within the south waste impoundment has yet been performed.
40. Page 8-6, Section 8.1.3.2: Concentrations of most COPCs in tissues are reportedly not well correlated with concentrations in nearby sediments. The report shall discuss potential explanations for this, which may include selective uptake of biota and/or sediment and biota movement.
41. Page 8-7, Sections 8.1.3.4 and 8.1.4: These sections shall be amended to reflect the changes that will be made based on the above comments. Such changes shall include deleting statements that omit discussion of, or otherwise mischaracterize the occurrence of groundwater in the soils of the north waste impoundment and transport of COPCs within that groundwater.
42. Page 8-11, Section 8.2.3: The discussion states that because sediments in the Old River to the west of the southern impoundment area demonstrate a very small potential contribution of dioxin and furan mixture representing the paper mill wastes (5 percent) in these samples, this indicates that there is no significant pathway from soil contamination to the aquatic environment in this area and those pathways have been modified in the corresponding conceptual site model as "incomplete or minor." However, this designation is deemed premature until additional sediment data is available to reflect sediment concentrations along the perimeter of this area; this discussion shall be deleted until further sampling of the Southern Impoundment area has been completed, and the pathway modification in Figure 6-33 showing these pathways as "incomplete or minor" shall be removed.
43. Page 8-10, Sections 8.2.3 and 8.2.4: These sections shall be amended to reflect the changes that will be made based on the above comments. Such changes will include deleting statements that omit discussion of, or otherwise mischaracterize the occurrence of groundwater in the soils of the south waste impoundment and transport of COPCs within that groundwater.
44. Table 3-1: This table presents potential ARARs (applicable or relevant and appropriate requirements) for the Site. Regarding the Texas Surface Water Quality Standards (TSWQS), the table states that "surface water quality standards are potentially relevant to the determination of risks, but should not override any site-specific toxicity values or risks determined through the risk assessment process." The PSCR shall be revised to state that the Texas Surface Water Quality Standards are ARARs. The TSWQS do specify human health fish only criteria for dioxins/furans.
45. Table 5-5: This table lists tissue analysis for many other fish species; this dioxin and furan data shall be compared in the Exposure Assessment to the tissue analysis.

developed for the report, to confirm that the contemporary tissue data are representative of edible tissue and ecological exposure.

46. Table 5-6 for sediment collected for the RI includes VOCs, but table 5-7 does not include VOCs for groundwater. The report shall clarify why VOCs are not included for groundwater.
47. Tables 6-3 through 6-30: The summary tables include a column called all data mean. It is unclear what this mean represents. For instance, Table 6-5 shows thallium with two detections with a minimum of 3.42 and maximum of 3.5, but the mean is 1.34. There are no detections for Aroclor 1016 in Table 6-6, but yet the mean is 545. The report shall be clarified regarding what the reported means represent, and how multiple detection limits were used for statistical analysis. The report shall include the raw data sets.
48. Tables 6-45 through 6-53: The REV for most COPCs/media exceeds the maximum concentration in the background data set. This aspect of the REV calculation shall be documented and be considered in the future, in the context of any comparisons of site data to background.
49. Figure 6-7: The shallow monitoring well symbol is different on the map than on the legend; the figure shall be corrected to provide consistent symbols. In addition, the figure shall include an explanation of the light grey line that starts just northwest of SJMWS04 and runs towards SJMWS03.
50. Figure 6-32: This figure shows exposure pathways in terms of complete significant, complete minor, and incomplete. If a pathway is considered to be complete, then regardless of whether it is considered minor or significant it shall be evaluated.
51. References: The reference list shall be updated with the final University of Houston and Parsons, 2009 TMDL. The reference is a draft final.
52. References: The Van den Berg reference on page 5-8 (1998) shall be added to the references.
53. References: The TCEQ 2010 reference (page 6-11) for classification of groundwater shall be added to the reference list.
54. References: Abdi 2007 is listed as a reference, but the citation in the text was not found. This reference citation shall be added to the text.
55. References: There are two Howell references for 2011, but it is not clear which Howell reference belongs to the selected text. These citations shall be clarified.

56. References: TCEQ and USEPA 2006 is listed as a reference, but the citation in the text was not found. This reference citation shall be added to the text.
57. References: TSDH 1966 is listed as a reference, but the citation in the text was not found. This reference citation shall be added to the text.
58. References: USEPA 1991 is listed as a reference, but the citation in the text was not found. This reference citation shall be added to the text.
59. References: USEPA 2010C is listed as a reference, but the citation in the text was not found. This reference citation shall be added to the text.
60. Appendix G1, Section 4.1: The report shall clarify the basis for the selected surrogate receptors.